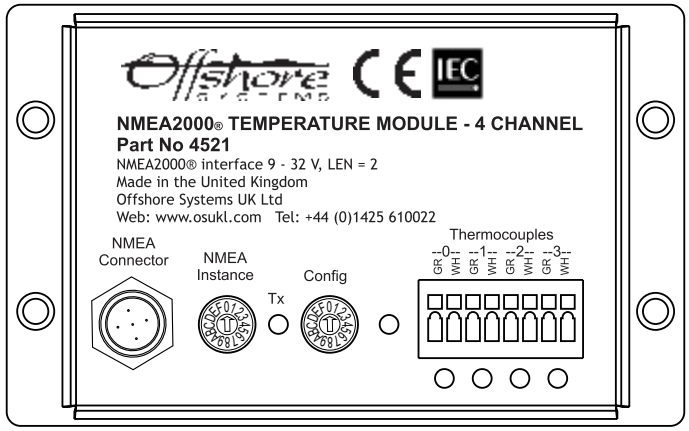
NMEA2000® 4 CHANNEL TEMPERATURE MODULE
Part Numbers: 4521
USER MANUAL



Revision 1.01

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1 INTRODUCTION

The Offshore System's NMEA2000® 4 Channel Temperature Module part no 4521 measures temperatures using type K thermocouples and transmits standard NMEA2000® temperature messages to the network.

This unit is designed to operate in a protected marine environment such as an engine room or below decks. It is very important that it is installed and set up correctly according to this manual. Please read and follow the installation and setup instructions carefully to achieve the best results.

The information in this manual corresponds to firmware revision 1.0.0

1.1 Product Features

The 4521 NMEA2000® 4 Channel Temperature Module has the following features:

- **NMEA2000® Interface**
- **Panel Mount or DIN Rail mount enclosure**
- **4 temperature input channels**
- **Has a blue LED to indicate transmission of temperature data**
- **User configurable to temperature type without needing any external equipment**
- **Has a red warning light for each channel to warn of damaged cables**

2 INSTALLATION

2.1 Unpacking the box

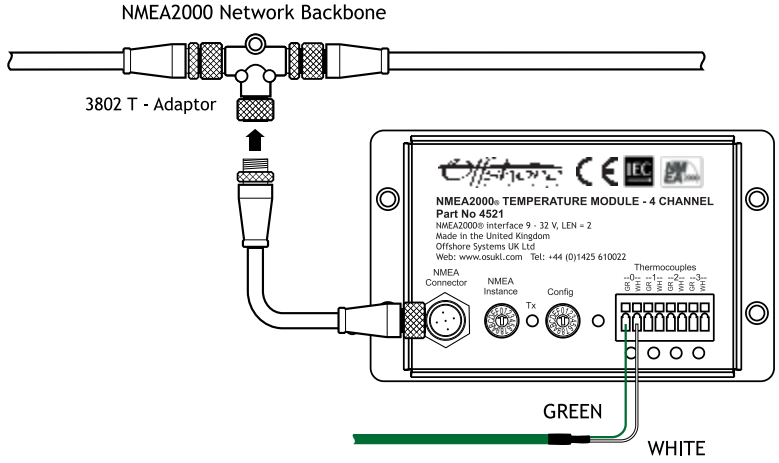
The following items are in the 4521 shipping box:
1 x 4521 NMEA2000® 4 Channel Temperature Module
1 x pair DIN rail mounting clips + 4x M3x6mm screws
1 x 4521 User Manual (This document)

2.2 Choosing the mounting location

The unit is designed to be mounted on a panel or a DIN rail in an electrical cabinet with free air circulation in a dry location below decks. The cabinet may be located in an engine room providing the ambient temperature does not exceed 50˚C (125˚F). The location needs to allow for connection to the NMEA2000® interface cable and the thermocouple cables.

2.3 Connecting the NMEA2000® Interface

The NMEA2000® interface cable on the unit should be connected to a nearby NMEA2000® Tee connector (part number 3802). The male end of the cable should be inserted into the female Tee connection noting the position of the keyway in the plug and the socket. The unit can be connected with power on or off without any damage. Ensure that the locking ring is securely tightened so that the connection remains sound.



2.4 Connecting the thermocouple cables

The thermocouple cables should be attached to the WAGO cage clamp terminal block being careful to connect the green wire to the terminal marked “GR” and the white wire to the terminal marked “WH” next to it.

The WAGO cage clamp terminals are opened by using a small screwdriver in the uppermost slot to open the cage clamp in the lower slot. Insert a suitably stripped wire end into the cage clamp then release the cage clamp by removing the small screwdriver.

3 CONFIGURATION

3.1 NMEA2000® Device Instance

NMEA2000® requires a unique Device Instance for each 4521 NMEA2000® 4 channel Temperature Module on a single network. This is settable from device instance 0 to Device Instance 15 using the left hand small rotary switch on the front panel labeled “NMEA Instance”. This can be set at any time regardless if power is on or off. The switch counts from 0 – 9 then A – F being equivalent to Device Instance 10 – 15.

3.2 Temperature Instance

On setting the Device Instance (3.1), the Device Temperature Instance is determined as follows. Temperature Instance number is shown the table below and is worked out using this formula.

Device Instance No (x4) + Channel Number = Temperature Instance.

Device Instance	*Formula*	**Channel No. 0**	**Channel No. 1**	**Channel No. 2**	**Channel No. 3**
0	x4 + ch =	0	1	2	3
1	x4 + ch =	4	5	6	7
2	x4 + ch =	8	9	10	11
3	x4 + ch =	12	13	14	15
4	x4 + ch =	16	17	18	19
5	x4 + ch =	20	21	22	23
6	x4 + ch =	24	25	26	27
7	x4 + ch =	28	29	30	31
8	x4 + ch =	32	33	34	35
9	x4 + ch =	36	37	38	39
A	x4 + ch =	40	41	42	43
B	x4 + ch =	44	45	46	47
C	x4 + ch =	48	49	50	51
D	x4 + ch =	52	53	54	55
E	x4 + ch =	56	57	58	59
F	x4 + ch =	60	61	62	63

3.3 Temperature Channel Source

Each of the four channels can have a source identity programmed to indicate the source of the temperature information. These are as follows:

Temperature Source	Config Value
Sea Temperature	0
Outside Temperature	1
Inside Temperature	2
Engine Room Temperature	3
Main Cabin Temperature	4
Live Well Temperature	5
Bait Well Temperature	6
Refrigeration Temperature	7
Heating System Temperature	8
Dew Point Temperature	9
Wind Chill Temperature Apparent	A
Wind Chill Temperature Theoretical	B
Heat Index Temperature	C
Freezer Temperature	D
Exhaust Gas Temperature	E
Not in Use	F

In order to set a temperature channel to the desired channel source information follow these simple steps.

- Turn the NMEA Instance Switch to the chosen channel.
- Turn the Config switch to the desired source identity and press the Config button. (identity as per table).
- When you have configured the channels then reset the NMEA Instance Switch to it's original setting.

4 FRONT PANEL INDICATORS

Each thermocouple connection has a red LED associated with it that will light if the thermocouple cable has been damaged or is not making a good connection. If this occurs then check that the cable is seated correctly in the WAGO cage clamp and that the run of the cable is undamaged. If the red LED is on after those checks then replace the temperature sender as it might have failed internally.

5 MAINTENANCE

- Clean the unit with a soft cloth.
- Do not use chemical cleaners as they may remove paint or markings or may corrode the enclosure or seals.
- Ensure that the unit is mounted securely and cannot be moved relative to the mounting surface. If the unit is loose, tighten the mounting screws.
- Check the security of the cables connected to the NMEA2000® connector and the WAGO connector, and tighten if necessary.

6 TECHNICAL SPECIFICATION

As Offshore Systems are constantly improving their products as specifications are subject to change without notice. Offshore System's products are designed to be accurate and reliable however they should only be used as aids to navigation and not as a replacement for traditional navigation aids and techniques.

Design Standard

Parameter	Comment
NMEA2000®	Level B
Maritime Nav and RadioComm Equipment	IEC60945
CE and FCC	Electromagnetic Compatibility

NMEA2000® Transmitted Parameter Group Numbers (PGNs)

Description	PGN No	PGN Name
Temperature	130312	Temperature
	130316	Temperature extended range
Requested PGNS	126464	PGN List
	126996	Product Information
	126998	Configuration Information
Protocol PGNs	059392	ISO Acknowledge
	059904	ISO Request
	060928	ISO Address Claim
	065240	ISO Address Command
	126208	Complex Command

Electrical and Mechanical

Parameter	Value	Comment
Operating Voltage	9 to 32 Volts	DC Voltage
Power Consumption	100mA	Average Operating
Load Equivalence Number	2	LEN
Reverse Battery Protection	Yes	Indefinately
Load Dump Protection	Yes	SAE J1113
Size	120x100x35mm	
Weight	160gm	

Environmental

Parameter	Value
IEC 60954 Classification	Protected
Degree of Protection	IP40
Operating Temperature	-25˚C to 50˚C
Storage Temperature	-40˚C to 70˚C
Relative Humidity	93%RH @40˚ per IEC60945-8.2
Vibration	2-13.2Hz @ ±1mm, 13.2-100Hz @ 7m/s2 per IEC 60945-8.7
Electromagnetic Emission	Conducted and Radiated Emission per IEC 60945-9
Electromagnetic Immunity	Conducted, Radiated, Supply, and ESD per IEC 60945-10
Safety Precautions	Dangerous Voltage, Electromagnetic Radio Frequency per IEC 60945-12

7 WARRANTY

Offshore Systems warrants this product to be free from defects in materials and workmanship for one year from the date of original purchase. If within the applicable period any such products shall be proved to Offshore Systems satisfaction to fail to meet the above limited warranty, such products shall be repaired or replaced at Offshore Systems option. Purchaser's exclusive remedy and Offshore Systems sole obligation hereunder, provided product is returned pursuant to the return requirements below, shall be limited to the repair or replacement, at Offshore Systems option, of any product not meeting the above limited warranty and which is returned to Offshore Systems; or if Offshore Systems is unable to deliver a replacement that is free from defects in materials or workmanship, Purchaser's payment for such product will be refunded. Offshore Systems assumes no liability whatsoever for expenses of removing any defective product or part, or for installing the repaired product or part or a replacement therefore or for any loss or damage to equipment in connection with which Offshore Systems products or parts shall be used. The foregoing warranties shall not apply with respect to products subjected to negligence, misuse, misapplication, accident, damages by circumstances beyond Offshore Systems control, to improper installation, operation, maintenance, or storage, or to other than normal use or service.

THE FOREGOING WARRANTIES ARE EXPRESSLY IN LIEU OF AND EXCLUDES ALL OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE.

Statements made by any person, including representatives of Offshore Systems, which are inconsistent or in conflict with the terms of this Limited Warranty, shall not be binding upon Offshore Systems unless reduced to writing and approved by an officer of Offshore Systems.

IN NO CASE WILL OFFSHORE SYSTEMS BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, DAMAGES FOR LOSS OF USE, LOSS OF ANTICIPATED PROFITS OR SAVINGS, OR ANY OTHER LOSS INCURRED BECAUSE OF INTERRUPTION OF SERVICE. IN NO EVENT SHALL OFFSHORE SYSTEMS AGGREGATE LIABILITY EXCEED THE PURCHASE PRICE OF THE PRODUCT(S) INVOLVED. OFFSHORE SYSTEMS SHALL NOT BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES, WHETHER ARISING OUT OF BREACH OF CONTRACT OR WARRANTY, TORT (INCLUDING NEGLIGENCE), OR OTHER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY OFFSHORE SYSTEMS, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO.

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WARRANTY RETURN PROCEDURE

To apply for warranty claims, contact Offshore Systems or one of its dealers to describe the problem and determine the appropriate course of action. If a return is necessary, place the product in its original packaging together with proof of purchase and send to an Authorized Offshore Systems Service Location. You are responsible for all shipping and insurance charges. Offshore Systems will return the replaced or repaired product with all shipping and handling prepaid except for requests requiring expedited shipping (i.e. overnight shipments). Failure to follow this warranty return procedure could result in the product's warranty becoming null and void.

Offshore Systems reserves the right to modify or replace, at its sole discretion, without prior notification, the warranty listed above.

8 TECHNICAL SUPPORT

If you require technical support for any Offshore Systems products you can reach us using any of the following ways:

- Tel: +44(0)1425 610022
- Fax: +44(0)1425 614794
- Email: support@osukl.com
- Web: www.osukl.com
- Post: Offshore Systems UK Ltd
  Unit 10-11 Milton Business Centre
  Wick Drive, New Milton, Hampshire BH25 6RH

Offshore Systems (UK) Ltd
Unit 10 -11 Milton Business Centre, Wick Drive,
New Milton, Hampshire, BH25 6RH, United Kingdom

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Email: mail@osukl.com Web: www.osukl.com

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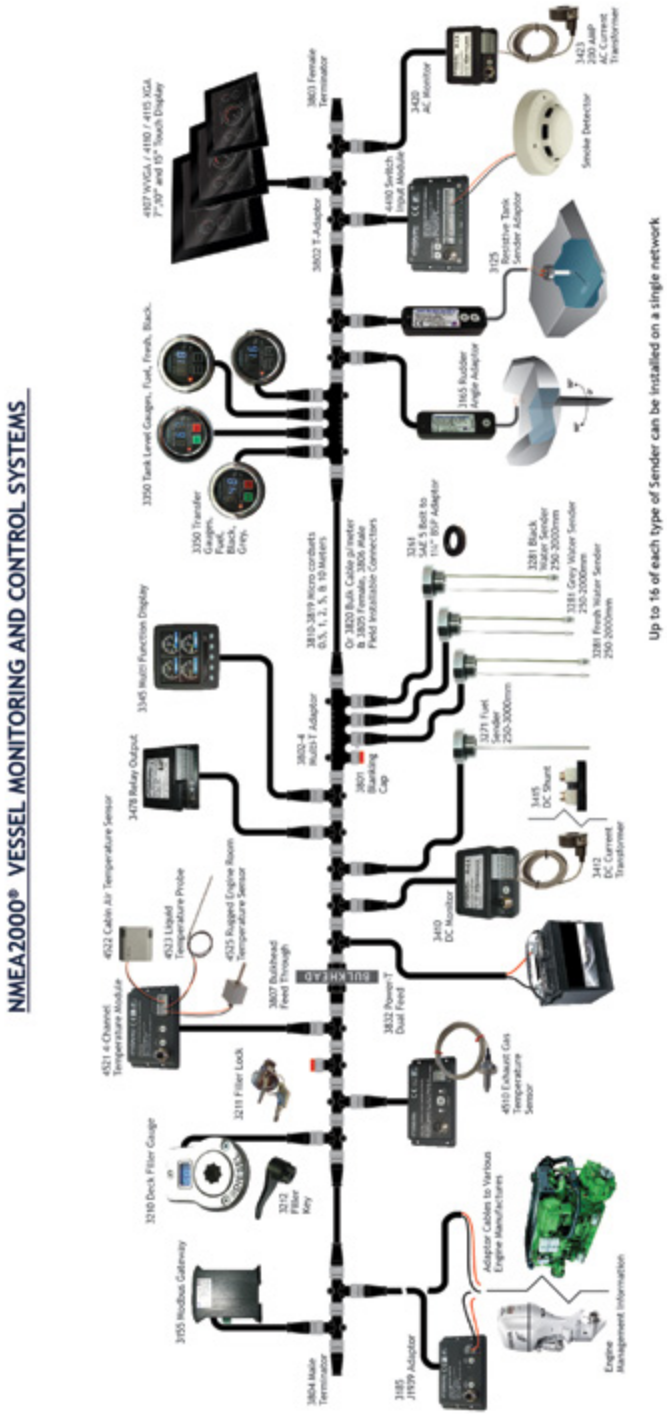
9 OFFSHORE SYSTEMS PRODUCT MAP


NMEA2000® VESSEL MONITORING AND CONTROL SYSTEMS
Up to 16 of each type of Sender can be installed on a single network
BULKHEAD